

## Sensory Coding

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Sensory coding is one of the several information processing occurrences in the nervous system. This process involves four different but highly related events, which include reception, transduction, coding, and awareness.



The banner features the Explorable logo at the top center, with the text "EXPLORABLE" in a large, bold, sans-serif font and "Quiz Time!" in a smaller, cursive font below it. Below the logo are three square images, each with a quiz title underneath. The first image shows a pair of red roller skates on a wooden deck, with the title "Quiz: Psychology 101 Part 2". The second image shows a fan of colorful pencils, also with the title "Quiz: Psychology 101 Part 2". The third image shows a Ferris wheel at sunset, with the title "Quiz: Flags in Europe". To the right of these images is a link that says "See all quizzes =>".

## Principles

The first phenomenon to take place when a stimulus reaches a receptor is called reception. During reception, the receptors absorb the physical energy of the stimulus, such as light.

After reception a process called transduction occurs, whereby the physical energy is transformed or transduced into electrochemical energy. This event is aided by the firing pattern of the neurons involved in transforming the physical energy. As a general rule, every receptor has been designed to perform transduction of only a single type of energy. For example, visual receptors can only transduce light energy, not sound or any other kind of energy. The intensity of the stimuli affects the activation potential of a receptor.

Coding is a phenomenon that happens after transduction [1]. It is a process wherein there is a one-to-one correspondence that occurs between the attributes of the stimulus and the attributes of the neuronal activity. Suppose neuron A has five frequencies of impulses of light energy in electrochemical form. In terms of coding, the given frequencies of impulses in neuron A might mean differently when the impulses reach neuron B, and any other neuron for that matter. According to Muller, this is an aspect of sensory coding that is called the law of

specific nerve energies.

Awareness is the fourth event when there is a probable perception of the sensory stimulus that has been encoded. This possible perception is in the conscious level of mind. The diagram below shows the four phenomena of sensory coding:

Scent molecules of a flower (stimulus) => Reach the olfactory receptors (Reception) => chemical reaction => depolarization of the receptors' resting potentials => neural firing (Transduction) => sensory information sent to the olfactory bulb in the brain via the olfactory nerve (Coding) => processed information sent to different parts of prefrontal cortex => recognition & perception of smell / scent (Awareness)

## Qualifications

There are several qualifications under sensory coding. First, the cells that have a spontaneous firing rate may create signals of one type of stimulus by means of an increase in the firing rate. If they are going to make signals for another type of stimulus, then they would do so by decreasing the firing rate. Second, the timing of action potentials may influence the sensory information. For example, movement may be signalled by neuron 2 firing right after neuron 1 fired. Third, the activities of other neurons may affect the coding of a sensory information in one neuron.

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**Source URL:** <https://explorable.com/sensory-coding>

### Links

[1] <http://openwetware.org/wiki/BIO254:Coding>